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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/711,815	10/07/2004	Markus Schwerdtfeger	P 7591 US	5814
30008 7590 03/07/2007 GUDRUN E. HUCKETT DRAUDT LONSSTR. 59 WUPPERTAL, 42289 GERMANY			EXAMINER SPAHN, GAY	
			ART UNIT 3635	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		03/07/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/711,815

Applicant(s)

SCHWERDTFEGER, MARKUS

Examiner

Gay Ann Spahn

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 August 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

The examiner is hereby vacating the Notice of Non-Compliant Amendment mailed on 03 November 2006 because the amendments made to the "Brief Description of the Drawing" section on page 3 of the Amendment filed on 22 August 2006 were in compliance with 37 CFR 1.121. The examiner misunderstood that Applicant was amending by replacement section and not simply inserting two new paragraphs and therefore, the amendments to the specification in the "Amendment" filed on 22 August 2006 are in compliance with 37 CFR 1.121. Consequently, Applicant's "Response to Notice of Non-Compliant Amendment (37 CFR 1.121)" filed on 08 November 2006 is not being entered as it does not comply with the requirements of 37 CFR 1.121.

The amendment filed 22 August 2006 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

(1) the two newly added paragraphs describing newly added Figs. 1A and 2 are considered to constitute new matter as not being supported by the original disclosure; and

(2) new drawing Figs. 1A and 2 are considered to constitute new matter as not being supported by the original disclosure.

More particularly, the examiner notes that although original claim 3 recited that "the sealing lip and the shell are comprised of different materials, respectively," since this was never illustrated in an original drawing figure, the addition of a drawing Figure 1A attempting to show exactly where the different materials are is considered to constitute new matter.

The examiner also notes that although the original disclosure disclosed conveying structures, ribs, and grooves, since this was never illustrated in an original drawing figure, the addition of drawing Figure 2 attempting to show exactly where the conveying structure, ribs and grooves are and how they are configured is considered to constitute new matter.

Applicant is required to cancel the new matter in the reply to this Office Action.

### ***Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the

(1) "sealing lip and the shell are comprised of different materials" as recited in claim 3,

(2) "at least one of the first conical surface and the second conical surface has at least one conveying structure" as recited in claim 11,

(3) "at least one conveying structure is selected from the group consisting of grooves, wave-shaped profiles, and ribs" as recited in claim 12,

(4) "conveying structure on the second conical surface is oriented opposite to the conveying structure of the first conical surface" as recited in claim 13, and

(5) "sealing lip is prestressed by a spring force in a direction toward the rotary machine part" as recited in claim 14,

must be shown or the features canceled from the claims. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1, 2, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over REINHARDT ET AL. (U.S. Patent No. 6,520,506) in view of ONUMA ET AL. (U.S. Patent No. 6,036,193).**

**As to claim 1, REINHARDT ET AL. disclose a radial shaft seal (1) comprising:**  
**a sealing ring comprising a support housing (2) and a shell of elastomer material (cross-hatched area) surrounding at least partially the support housing (2);**

**wherein the sealing ring comprises a sealing lip (3) having a sealing edge (13) or sealing surface configured to rest seal-tightly against a rotary machine part (5);**

**wherein the sealing lip (3) has a first conical surface (16) at a first side facing a medium to be sealed (6) and a second conical surface (14) at a second side facing a surrounding atmosphere (7), wherein the first and second conical surfaces (16, 14) adjoin the sealing lip (3);**

**wherein between the rotary machine part (5) and the first conical surface (16) a first contact surface angle ( $\beta$ ) is formed and wherein between the rotary machine part (5) and the second conical surface (14) a second contact surface angle ( $\alpha$ ) is formed;**

**wherein the first contact surface angle ( $\beta$ ) is adjusted to be between approximately 0 degrees and approximately 30 degrees (see col. 2, lines 28-29,**

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wherein it states that the beta angle is selected to be between 15 to 30 degrees, preferably 17 to 22 degrees) and the second contact surface angle ( $\alpha$ ) is adjusted to be between approximately 30 degrees up to approximately 70 degrees (see col. 2, lines 29-30, wherein it states that the alpha angle is selected to be between 35-65 degrees, preferably 45 to 60 degrees); and

wherein the first contact angle causes, during operation of the sealing ring, a conveying action of the medium to the sealing edge so that the sealing edge is cooled and lubricated by the medium (the examiner notes that since REINHARDT ET AL. has a first contact surface angle that meets the structure recited, the first contact surface angle of REINHARDT ET AL. is necessarily capable of performing the same function of performing conveying action in order to cool and lubricated the sealing edge).

However, REINHARDT ET AL. fail to explicitly disclose that the first conical surface has a first conveying structure that improves the conveying action of the medium toward the sealing edge for cooling and lubricating the sealing edge.

ONUMA ET AL. disclose that the first conical surface (28) has a first conveying structure (ribs 40) that improves the conveying action of the medium toward the sealing edge for cooling and lubricating the sealing edge.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the radial shaft seal of REINHARDT ET AL. by making the first conical surface have a first conveying structure as taught by ONUMA ET AL. in order to in order to improve the conveying action of the medium towards the sealing

edge via the conveying structures or ribs to improve the hydrodynamic sealing capabilities and promote cooling and lubricating of the sealing edge.

As to claim 2, REINHARDT ET AL. in view of ONUMA ET AL. disclose the radial shaft seal according to claim 1 as discussed above, and REINHARDT ET AL. also disclose that the sealing lip (3) is a monolithic part of the shell (cross-hatched area).

As to claim 14, REINHARDT ET AL. in view of ONUMA ET AL. disclose the radial shaft seal according to claim 1 as discussed above, and REINHARDT ET AL. also disclose that the sealing lip (3) is prestressed by a spring force (via spring 4) in a direction toward the rotary machine part (shaft 5).

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over REINHARDT ET AL. (U.S. Patent No. 6,520,506) in view of ONUMA ET AL. (U.S. Patent No. 6,036,193), as applied to claim 1 above, and further in view of any one of JOHNSTON '624 (U.S. Patent No. 6,729,624), BAINARD (U.S. Reissue Patent No. Re. 33,029), OTTO (U.S. Patent No. 6,050,570), or MATSUSHIMA ET AL. (U.S. Patent 6,182,975).

As to claim 3, REINHARDT ET AL. in view of ONUMA ET AL. disclose the radial shaft seal according to claim 1 as discussed above.

However, neither REINHARDT ET AL. nor ONUMA ET AL. explicitly disclose that the sealing lip and the shell are comprised of different materials, respectively.

Any one of JOHNSTON '624 (see resinous ring (50) of Figs. 12A-12c), BAINARD (see liner (26) of Fig. 3), OTTO (see insert (66) of Fig. 2), or MATSUSHIMA ET AL. (see



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resin liner (407) of prior art Fig. 13) discloses that the sealing lip (Teflon<sup>®</sup> material) and the shell (elastomeric material) are comprised of different materials, respectively.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the radial shaft seal of REINHARDT ET AL. in view of ONUMA ET AL. by making the sealing lip be made of a different material (i.e., Teflon<sup>®</sup> material) than the material of the shell (i.e., elastomeric material) as taught by any one of JOHNSTON '624, BAINARD, OTTO, or MATSUSHIMA ET AL. in order for the sealing lip to slide more easily on the rotating shaft and thereby, cause less wear damage.

**Claims 4-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over REINHARDT ET AL. (U.S. Patent No. 6,520,506) in view of ONUMA ET AL. (U.S. Patent No. 6,036,193), as applied to claim 1 above, and further in view of MOHR (U.S. Patent No. 6,722,659) and HOSOKAWA ET AL. (U.S. Patent No. 6,367,811).**

As to claim 4, REINHARDT ET AL. in view of ONUMA ET AL. disclose the radial shaft seal according to claim 1 as discussed above.

However, neither REINHARDT ET AL. nor ONUMA ET AL. explicitly disclose a support ring against which support ring the sealing ring rests, wherein the support ring is arranged on a side of the sealing ring facing the surrounding atmosphere.

MOHR (see Fig. 2) discloses a common variant of a shaft seal wherein protective lip (15 as shown in Fig. 1) is not provided (see col. 1, lines 60-62).

HOSOKAWA ET AL. disclose a support ring (12 in Fig. 4) against which support ring (12) the sealing ring (5) rests, wherein the support ring (12) is arranged on a side of the sealing ring (5) facing the surrounding atmosphere.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the radial shaft seal of REINHARDT ET AL. in view of ONUMA ET AL. by making the elastomeric body be configured as the common variant that does not have a second sealing lip as taught by MOHR and by including support ring against the sealing ring on a side of the sealing ring facing the surrounding atmosphere as taught by HOSOKAWA ET AL. in order to provide extra support for the conical surface of the seal lip on the air side so as to protect the sharp tip of the sealing lip from being worn down.

As to claim 5, REINHARDT ET AL. in view of ONUMA ET AL., MOHR and HOSOKAWA ET AL. disclose the radial shaft seal according to claim 4 as discussed above, and HOSOKAWA ET AL. also disclose that the support ring (12) has an L-shaped cross-section.

As to claim 6, REINHARDT ET AL. in view of ONUMA ET AL., MOHR and HOSOKAWA ET AL. disclose the radial shaft seal according to claim 4 as discussed above, and HOSOKAWA ET AL. also disclose that the support ring (12) comprises an axial part (16) resting against the sealing lip (13b).

As to claim 7, REINHARDT ET AL. in view of ONUMA ET AL., MOHR and HOSOKAWA ET AL. disclose the radial shaft seal according to claim 6 as discussed above, and HOSOKAWA ET AL. also disclose that the axial part (16) of the support ring

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(12) has a conical support surface (extending above dashed line illustrating bottom limit of angle  $\theta$ ) tapering in a direction toward the medium to be sealed (33).

As to claim 8, REINHARDT ET AL. in view of ONUMA ET AL., MOHR and HOSOKAWA ET AL. disclose the radial shaft seal according to claim 7 as discussed above, and HOSOKAWA ET AL. also disclose that the conical support surface (extending above dashed line illustrating bottom limit of angle  $\theta$ ) has an angle matching the first contact surface angle.

As to claim 9, REINHARDT ET AL. in view of ONUMA ET AL., MOHR and HOSOKAWA ET AL. disclose the radial shaft seal according to claim 6 as discussed above, and HOSOKAWA ET AL. also disclose that the support ring (12) comprises a radial part (15), wherein the support housing (2) and the shell (5) rest against the radial part (15) of the support ring (12).

As to claim 10, REINHARDT ET AL. in view of ONUMA ET AL., MOHR and HOSOKAWA ET AL. disclose the radial shaft seal according to claim 9 as discussed above, and HOSOKAWA ET AL. also discloses that the radial part (15) of the support ring (12) extends essentially across an entire radial width of the sealing ring (5).

Claim 11-13 is rejected under 35 U.S.C. 103(a) as being unpatentable over REINHARDT ET AL. (U.S. Patent No. 6,520,506) in view of ONUMA ET AL. (U.S. Patent No. 6,036,193), as applied to claim 1 above, and further in view of DIETLE (U.S. Patent No. 6,494,462).

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**As to claim 11, REINHARDT ET AL.** in view of ONUMA ET AL. disclose the radial shaft seal according to claim 1 as discussed above.

However, neither REINHARDT ET AL. nor ONUMA ET AL. explicitly disclose that the second conical surface has a second conveying structure.

DIETLE discloses that the second conical surface (either 54 or 8) has at least one conveying structure (18).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the radial shaft seal of REINHARDT ET AL. in view of ONUMA ET AL. by making the second conical surface have a second conveying structure as taught by DIETLE in order to in order to provide pumping action by the conveying structure toward the sealing edge.

**As to claim 12, REINHARDT ET AL.** in view of ONUMA ET AL. and DIETLE disclose the radial shaft seal according to claim 11 as discussed above, and DIETLE also discloses that the first and second conveying structures (ribs 18 or grooves 17) are selected from the group consisting of grooves, wave-shaped profiles, and ribs.

**As to claim 13, REINHARDT ET AL.** in view of ONUMA ET AL. and DIETLE disclose the radial shaft seal according to claim 11 as discussed above, and DIETLE (see Figs. 6, 6A-G, 7, 7A-B, 8, 9, 14, and 14A-c) discloses that the second conveying structure (either of ribs 18 or grooves 17) of the second conical surface (one of 54 or 8) is oriented opposite to the first conveying structure (either of ribs 18 or grooves 17) of the first conical surface (other of 54 or 8).

***Response to Arguments***

Applicant's arguments with respect to claims 1-14 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gay Ann Spahn whose telephone number is (571)-272-7731. The examiner can normally be reached on Monday through Friday, 10:30 am to 7:00 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl D. Friedman can be reached on (571)-272-6842. The fax phone number for the organization where this application or proceeding is assigned is (571)-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

<sup>GAS</sup>  
Gay Ann Spahn, Patent Examiner  
February 28, 2007

Robert Canfield  
Primary Examiner

